

REMARKS

In response to the above-identified Office Action, Applicants amend the application and seek reconsideration thereof. In this response, Applicants amend Claims 17 and 20. Applicants do not cancel or add any claims. Accordingly, Claims 1-7 and 17-20 are pending.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "Version With Markings To Show Changes Made."

I. Claims Rejected Under 35 U.S.C. § 102(b)

The Patent Office rejects Claims 1-4, 6 and 7 under 35 U.S.C. § 102(b) as anticipated by Matsuo. Applicants respectfully traverse this rejection.

In order to anticipate a claim, the relied upon reference must disclose every limitation of the claim. Among other limitations, independent Claim 1 recites that the first and second reaction chambers are separated by a distance equivalent to the lifetime of nitrogen ions. Applicants submit that at least this limitation is not disclosed by Matsuo.

In maintaining the rejection, the Patent Office states that Applicants have failed to point out where Matsuo teaches that zero tube length is best between a plasma generator and an etch chamber when nitrogen supplementation is contemplated. In response, Applicants refer the Patent Office to Section III.A.2. and Figure 4 of Matsuo, which, when taken together, disclose that zero tube length yields the highest etch rate for all three test cases when nitrogen gas is added to the existing plasma discharge. Thus, these three test cases of Matsuo teach away from any tube length beyond zero, which results in a decrease in the etch rate. Therefore, Matsuo cannot be reasonably relied upon to disclose an apparatus in which a first chamber and second chamber are separated by a distance equivalent to the lifetime of nitrogen ions, as recited in Applicants' independent Claim 1.

The Patent Office further notes that Matsuo teaches that the tube length is variable to optimize the stated objectives of Matsuo. However, Applicants submit that although Matsuo does teach that the tube length can be varied to optimize process objectives, the variations taught by Matsuo are directed towards improving etch rates by adding nitrogen gas to a plasma discharge. However, the language of Applicants' Claim 1 refers to a separation distance between the first and

second chambers that is dictated by the lifetime of nitrogen ions, which is a far cry from changing the length, lining material, and geometry of the tube taught by Matsuo in order to improve etch rates. Thus, any variations taught by Matsuo give no guidance as to the removal of nitrogen ions from a plasma by separating the first chamber from the second chamber by a distance equivalent to the lifetime of the nitrogen plasma ions.

Independent Claim 6 is also not anticipated by Matsuo because Matsuo does not describe means for providing a plasma from a nitrogen gas to a second reaction chamber substantially free of ions such that nitrogen radicals would react with a substrate in a film conversion step, as recited in Applicants' independent Claim 6. Specifically, Matsuo does not describe that nitrogen radicals are separated from nitrogen ions. Rather, the nitrogen gas of Matsuo is merely added to improve etch rates, without any teaching of a device that generates a plasma from nitrogen and subsequently separates out the nitrogen radicals for delivery to a process chamber, as recited in Applicants' Claim 6.

Accordingly, Applicants respectfully request withdrawal of the rejection of independent Claims 1 and 6. Claims 2-4 and 7 respectively depend from independent Claims 1 and 6 and are not anticipated at least for the same reasons.

The Patent Office rejects Claims 17-20 under 35 U.S.C. 102(b) as anticipated by Moslehi.

Among other limitations, amended independent Claims 17 and 20 each recite that the first and second chambers are separated by a distance equivalent to the lifetime of nitrogen ions. Applicants submit that at least this limitation is not disclosed by Moslehi.

Applicants submit that amended independent Claims 17 and 20 are not anticipated by Moslehi because Moslehi does not describe a system including a first reaction chamber and a second reaction chamber wherein the first reaction chamber is separated from the second reaction chamber by a distance equivalent to the lifetime of nitrogen ions, as set forth in amended independent Claims 17 and 20. Rather, Moslehi teaches delivering both charged and neutral species to a process chamber.

Although Moslehi does disclose controlling the plasma density, Moslehi fails to disclose the removal of ions from a plasma generated from nitrogen by separating the plasma generation chamber ("first chamber") from a substrate site ("second chamber") by a distance equivalent to the lifetime of ions. Thus, at least this limitation is not disclosed by Moslehi.

Accordingly, Applicants respectfully request withdrawal of the rejection of amended independent Claims 17 and 20. Claims 18 and 19 depend from amended independent Claim 17 and are not anticipated at least for the same reasons.

II. Claims Rejected Under 35 U.S.C. § 103(a)

The Patent Office rejects Claim 5 under 35 U.S.C. § 103(a) as obvious over Matsuo in view of Yamazaki.

Applicants reiterate that Claim 5 depends from independent Claim 1 and contains all of the limitations thereof. Thus, Claim 5 is not obvious over the cited references in combination at least for the same reasons stated above in regards to independent Claim 1. Specifically, the cited references in combination fail to teach or suggest a first reaction chamber coupled to a second reaction chamber and separated by a distance equivalent to the lifetime of nitrogen plasma ions at a plasma generation rate.

Accordingly, Applicants respectfully request withdrawal of the rejection of Claim 5.

CONCLUSION

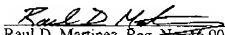
In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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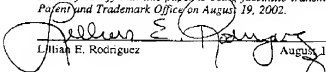
Dated: 8/19, 2002


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CERTIFICATE OF TRANSMISSION:

I hereby certify that this paper is being facsimile transmitted to the U.S. Patent and Trademark Office on August 19, 2002.


Liliana E. Rodriguez

8-19-02
August 19, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Please amend the claims as follows:

17. (Four Times Amended) A system for reacting a plasma with a substrate, comprising:
- a first chamber;
 - a nitrogen gas source coupled to the first chamber comprising constituents adapted to react with a substrate;
 - an energy source coupled to the first chamber;
 - a second chamber configured to house a substrate for film formation processing;
 - a system controller configured to control the introduction of a gas from the gas source into the first chamber and to control the introduction of an energy from the energy source; and
 - a memory coupled to the controller comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of the system, the computer-readable program comprising:
 - instructions for controlling the gas source and the energy source to convert a portion of a gas supplied by the gas source into a plasma comprising plasma ions and radicals,
 - wherein the first reaction chamber is separated from the second reaction chamber by a distance equivalent to the lifetime of the ions at a plasma generation rate such that the radicals [suitable to deliver the plasma to the second chamber substantially free of ions to] react with a substrate in the second chamber in a film conversion step.
20. (Amended) A machine readable storage medium containing executable program instructions which when executed cause a digital processing system to perform a method of reacting a plasma with a substrate, comprising:
- generating a plasma from nitrogen comprising radicals and ions in a first chamber; and
 - transferring the plasma radicals via a distance equivalent to the lifetime of the ions into a second chamber substantially free of ions.